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To cite this article: Ian Miller & Lewis Stitt (2021) The Vulcan Works, Southport: The Archaeology of an Edwardian Car Factory, *Industrial Archaeology Review*, 43:1, 34-52, DOI: [10.1080/03090728.2021.1885878](https://doi.org/10.1080/03090728.2021.1885878)

To link to this article: <https://doi.org/10.1080/03090728.2021.1885878>



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Published online: 24 Feb 2021.



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# The Vulcan Works, Southport: The Archaeology of an Edwardian Car Factory

Ian Miller  and Lewis Stitt

## ABSTRACT

The widespread adoption of the motor car had what was perhaps the greatest impact on the physical and social landscape of 20th-century Britain, and yet virtually none of the early car factories have been subject to formal archaeological investigation. In 2019–20, Salford Archaeology carried out a comprehensive survey of the former Vulcan Works, a purpose-built factory that was erected near Southport in 1907 by Thomas and Joseph Hampson, two pioneers of the British motor-manufacturing industry. Initially, this ‘state-of-the-art’ factory comprised an architecturally impressive two-storey office with a single-storey machine and erecting shop to the rear, together with the associated power plant. Extensive additions had increased the size of the works to more than 3.6ha by 1924, and whilst the buildings were repurposed as a general engineering works in 1937, the original Edwardian car factory remained largely unaltered. The archaeological survey, coupled with historical research and limited excavation, has provided a unique record of a rare survivor of Britain’s fledgling car-manufacturing industry prior to its demolition.

## KEYWORDS

Vulcan Motor & Engineering Company; Hampson; Southport; Brockhouse engineering; car factory

## Introduction

The introduction of the motor vehicle was perhaps one of the defining attributes of the 20th century, and undoubtedly wrought some of the greatest changes to the English landscape and society.<sup>1</sup> The plethora of literature published on motor cars has focused to a large extent on the histories of individual firms, particular marques and their sporting achievements, whilst the premises in which they were produced, and the rapid evolution from small-scale assembly by skilled craftsmen to mass production in purpose-built factories, has attracted surprisingly little research. A notable exception is Paul Collins’ and Michael Stratton’s *British Car Factories from 1896*, which provides a comprehensive gazetteer of British motor-vehicle works, together with an overview of their architectural evolution and the technical development of the industry.<sup>2</sup> This authoritative work was the culmination of a research project implemented in 1986 that identified a total of 1,542 vehicle-manufacturing sites, of which 224 were found to survive in some built form.<sup>3</sup>

Beyond the assessment survey carried out by Collins and Stratton, however, virtually no early purpose-built car factories have been studied archaeologically. The sites of several former car factories have been subject to intrusive archaeological investigations, although these invariably focused on earlier remains with little or no attention paid to any physical evidence for car production.<sup>4</sup> An opportunity to redress this shortfall was provided by a proposal to redevelop the former Vulcan Works in Crossens, near Southport. The factory was erected in 1907 for the Vulcan Motor & Engineering Company, which was one of seven small companies in the Southport area of south-west Lancashire that produced motor vehicles during the early 20th century, although it was the only local firm that remained in business at the outbreak of the First World War. As with most works of its type, production was largely given over to munitions and aircraft assembly to assist with the war effort following the ‘Shell Scandal’ of 1915, and this heralded an expansion of lorry production at the factory. Whilst the company ceased building cars in 1928, production of commercial vehicles continued until the late 1930s.

At its zenith, the Vulcan Works consisted of two-storey office and warehouse ranges, single-storey machine and erecting shops, a large power plant, a saw mill, and body building, upholstering

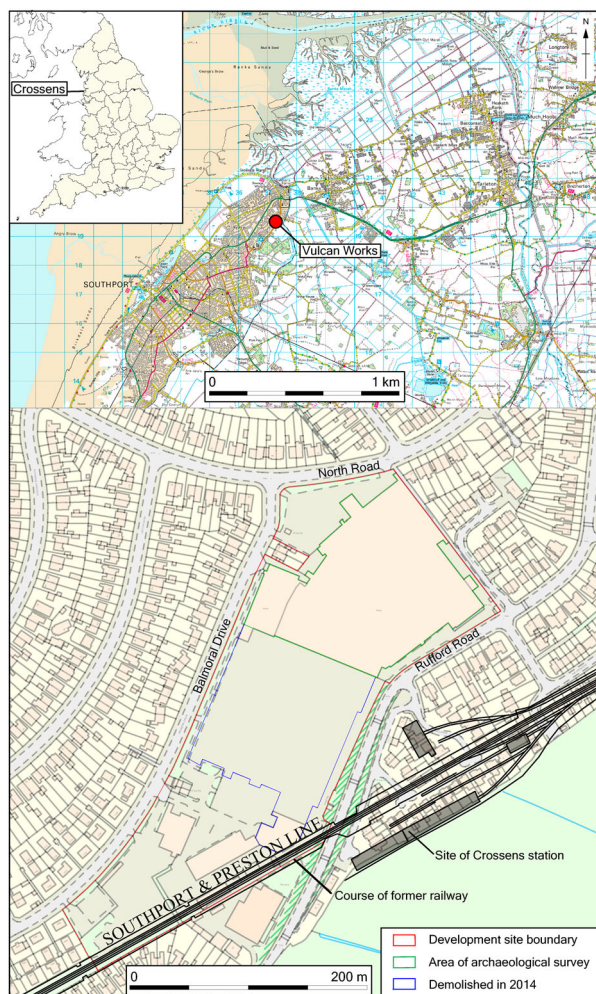
and painting workshops, together with a tall clocktower, that were all built in several phases between 1907 and 1924, ultimately covering an area of 3.65ha. A large part of the complex was demolished in 2014, although the earliest elements of the factory were at that time spared. These buildings were subject to a comprehensive survey by Salford Archaeology in 2019, coupled with targeted excavation that followed the final clearance of the site in 2020 in advance of the redevelopment of the site for housing.<sup>5</sup>

## Location

The Vulcan Works lay on the south-western fringe of Crossens, some 4km to the north-east of Southport in the Merseyside district of Sefton (centred on NGR SD 37245 19465). The village forms part of the historic township of North Meols, and occupies a raised island of boulder clay, surrounded by estuarine alluvium and silts; the mouth of the River Ribble lies to the north and west, with the extensive Martin Mere a short distance to the east (Figure 1).

An ambitious scheme to drain Martin Mere was implemented as early as 1692, when Thomas Fleetwood of Bank Hall in Bretherton excavated a 2.4km-long sluice between the edge of the mere and the sea, cutting through the banked alluvium at Crossens. Further drainage works were carried out by Thomas Eccleston of Scarisbrick Hall almost a century later, but Crossens remained a small and isolated settlement despite these land-reclamation schemes.<sup>6</sup> This is implicit on the Ordnance Survey first edition 6in.: 1 mile map of 1848, which shows Crossens as a nucleated hamlet surrounded by cultivated land and saltmarsh. Whilst Southport experienced dramatic growth in the 19th century, Crossens remained a rural backwater with a population of 575 recorded in the 1851 Census, increasing by just over 100 by 1871. The local perception of Crossens’ isolation is reflected in a newspaper article of this period, which advised that ‘every allowance must be made for the backward opinions of the villagers [of Crossens] for hitherto they have lived according to the ideas of the Middle Ages’.<sup>7</sup>

A significant event in the evolution of Crossens to a settlement of some note was a proposal by the West Lancashire Railway Company to construct a line between Southport and Preston, which received Royal Assent in 1871. The first section of this new line, between Southport and Hesketh Bank, opened to



**Figure 1.** Location of the Vulcan Works, and the sequence of Ordnance Survey maps showing the development of Crossens and Southport 1848–1928.

public service in February 1878 and included a station and goods yard between Crossens and Churchtown.<sup>8</sup> The completion of the line to Preston in September 1882 attracted new residents to Crossens, including commuters and railway employees, with the local population increasing to just over 1,000 by 1881. The associated demand on the housing stock was met with new residential development, as on Brade Street, where 28 new houses were built in the 1880s by a local farmer.<sup>9</sup>

The West Lancashire Railway was purchased by the Lancashire & Yorkshire Railway in 1897, which implemented a pioneering scheme to electrify routes serving affluent suburbs. This was completed to Crossens in 1904 and undoubtedly stimulated further expansion of the village as a residential suburb, but also signalled its transformation from an agricultural settlement to a regional centre for the emerging motor-vehicle industry, with easy access to an increasing market for motor cars amongst the affluent residents of Southport.

### Early Car Factories in Context

Most of the pioneers of the British motor-vehicle industry in the late 19th and early 20th centuries commenced business on a small scale, as few had access to sufficient capital to invest in what was essentially an untested industry. The early 'factories' were typically adaptations of redundant industrial premises, such as engineering shops, tram-car works and other light engineering buildings.<sup>10</sup> A notable example were Harry Lawson's companies that started producing vehicles in 1896 in a converted cotton mill in Coventry known appropriately as Motor Mills. Whilst Lawson was ultimately unsuccessful, this enterprise is regarded

as representing the inception of the British motor industry, and established Coventry as the geographic heart of the fledgling industry.<sup>11</sup> In the years up to 1900, there were about 80 firms producing motor vehicles in Britain, of which three-quarters were located in the West Midlands (primarily Coventry, Birmingham and Wolverhampton), with the other main centres comprising Outer London, Manchester and Glasgow. A rapid expansion of the industry during the early 20th century culminated in more than 1,500 sites where motor vehicles were produced, but few of these were conceived as purpose-built factories.<sup>12</sup>

The first purpose-built car works in Britain were Madelvic Motors that was established in Edinburgh by William Peck in 1899, and John Dennis' Rodboro Buildings in Guilford in 1901.<sup>13</sup> Dennis had started his business during the previous year in a redundant barracks before relocating to a new multi-storey factory of brick and cast iron (now a Grade II listed building). Different departments in the assembly process were located on the various floors, with the top floor being used for finishing, including painting, and was thus particularly well-lit. Notwithstanding the problems of transferring partially assembled cars between floors and the limitations to expansion that soon became all too apparent to John Dennis, some other car manufacturers also started their business in former textile mills, such as the Black Prince Motors Ltd that occupied Thorngate Mill in Barnard Castle from 1919.<sup>14</sup> Several American manufacturers similarly adopted the multi-storey form, reaching its zenith in the four-storey 'daylight factory' designed and built by Albert Kahn for Henry Ford at his Highland Park factory in Detroit between 1908 and 1910. This was seen by some as an archetype of industrial efficiency, and was emulated by a few leading European firms, such as Fiat in Turin. Some British firms erected a 'daylight factory' on the American model, including Tilling-Stevens Ltd in Maidstone in 1917, although a preference for single-storey works fitted with a north-light roof, and often placed to the rear of a two- or three-storey office range became the preferred format. The Clément-Talbot Works in West London, built in 1903–4, provides a fine example of this layout and has been cited as a model Edwardian car factory. Other early examples included those of Sheffield-Simplex in Sheffield (1905), Sunbeam in Wolverhampton (1905–6), Vauxhall in Luton (1907) and Humber in Coventry (1908).

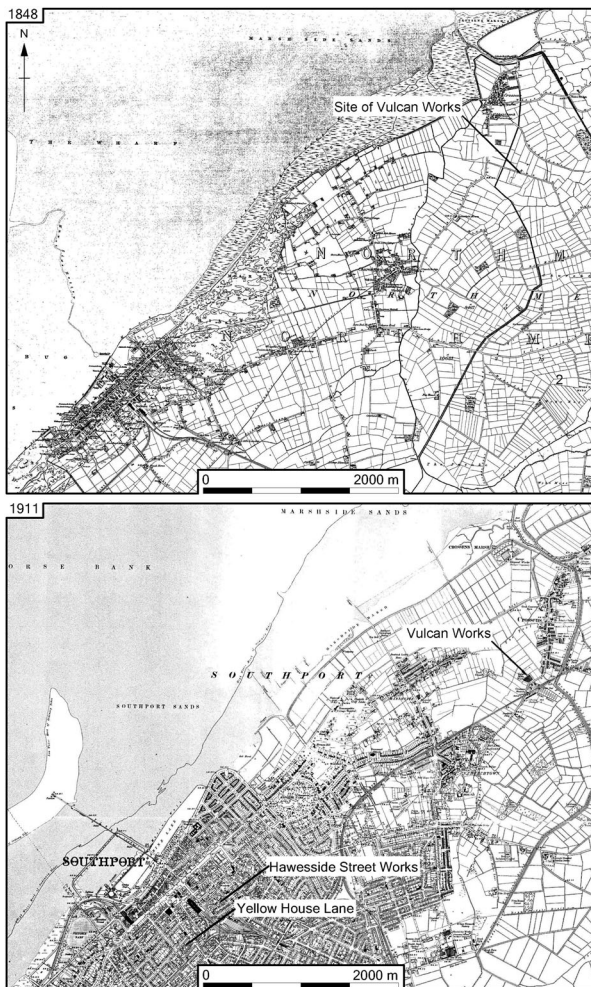
### Origins of the Vulcan Marque

#### Thomas and Joseph Hampson

The Vulcan marque was developed by Thomas and Joseph Hampson, two pioneers of the British motor-car industry. The Hampson brothers were born in Wigan in 1867 and 1872 respectively, sons of Joseph Hampson, a joiner, and in 1881 were living at 17 Greenough Street in Wigan, together with their brother William and two sisters.<sup>15</sup> Joseph and William followed in their father's footsteps and spent their early careers training as joiners, whilst Thomas moved to London 'where he engaged in technical education as an instructor' and, after living for a short while in Nottingham, was appointed chief manual instructor at the Bolton Technical College in 1892, 'having charge of all the woodwork and metal-working classes'.<sup>16</sup> Whilst at Bolton, he built an experimental motor car with assistance from his brother Joseph.<sup>17</sup> It is possible that the car had been completed as early as 1896 as, in 1912, whilst defending an allegation of dangerous motoring, Joseph proclaimed in court that he had been 'driving a car for about 16 years'.<sup>18</sup>

Joseph Hampson had moved to Southport by 1901, where he made a living initially as a cabinet-maker.<sup>19</sup> In 1902, in partnership with Thomas, he established the Vulcan Motor Manufacturing & Engineering Company Ltd, occupying premises at Yellow House Lane (Figure 2). Joseph Hampson is named as the manager of the company in a trade directory for 1902, and whilst there is no





**Figure 2.** Ordnance Survey mapping of 1848 and 1911 showing the expansion of Southport and Crossens, and the location of the Hampsons' motor-vehicle works.

mention of Thomas Hampson, he was described in a newspaper report in 1903 as a 'motor-car driver of Southport' who was fined 20s for 'furiously driving a motor car in Middleton Road, Prestwich'.<sup>20</sup>

### **The Vulcan Motor Manufacturing & Engineering Company Ltd**

The Hampsons built their first motor car at Yellow House Lane in 1902. This was a 4hp, single-cylinder, belt-driven model with a wooden chassis, and was evidently successful as the Hampsons sought larger premises in the same year, and secured the lease of an old drill hall off Hawesside Street in Southport (Figure 2). This had a former parade ground to the rear, alongside Segar Street (renamed subsequently to Vulcan Street), that provided an opportunity to expand the works as required. Despite being hidden amidst suburban terraces, this was 'practically the first industry of a manufacturing nature in Southport' and provided work for about 200 men.<sup>21</sup> The range of cars was increased in 1903 with the introduction of a 6.5hp model fitted with an 'armoured ash' chassis, whilst twin-cylinder models with a steel chassis began to be produced in 1904. The company exhibited at the automobile show at Crystal Palace in February 1904, and was also well represented at the first automobile show to be held at Olympia in Kensington in February 1905.<sup>22</sup> By the end of that year, the company's sales figures had increased from £9,000 in 1904 to £17,000.

A correspondent from *The Autocar* visited the Hawesside Street works in April 1906 and noted that 'practically everything was made on the ground', including the wheels, and 'the latest

design of labour-saving and quick production machines were fitted irrespective of cost'. This was echoed several months later in a report on the Lancashire motor-car industry that considered the Vulcan Motor Company to be 'certainly one of the most successful concerns in the district'.<sup>23</sup> This was reflected in the sales figures for 1906, which had rocketed to £43,000.

Commercial vehicles including a six-cylinder van were also being produced by 1906, when the company took a decision to obtain new premises. This coincided with the voluntary liquidation of the Vulcan Motor Manufacturing & Engineering Company Ltd and the formation of the Vulcan Motor & Engineering Company (1906) Ltd. Thomas Hampson was the managing director of the new company and Joseph Hampson, whilst not on the board of directors, was responsible for much of the basic design of the cars. William Hampson also joined the firm in 1906, initially as a clerk of works but, utilising his skills as a joiner and cabinet-maker, soon took charge of the coach-building department. Creating the new company allowed £63,000 of capital to be raised, enabling the plans for a new purpose-built factory in Crossens to be set in motion. The coming of the new factory was announced in December 1906, with reports that the Vulcan Company had purchased an acre (0.4ha) of land and 'the work, which will be proceeded with at once, will cost £9,000'. It was also reported that cottages were to be built in the vicinity of the factory to house the workforce, which was expected to be about 750 hands, with an estimated total increase to the local population of about 2,500 or 3,000 people.<sup>24</sup>

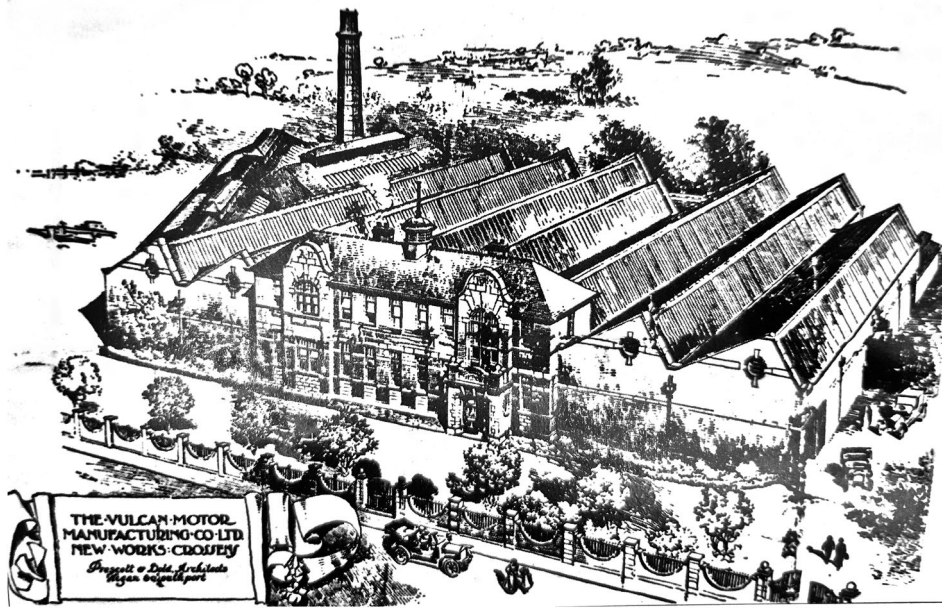
### **The Purpose-built Factory of 1907**

Prescott & Bold of Wigan were commissioned as architects for the new factory, and whilst they went on to design the Grand Theatre and Hippodrome in Leigh in 1907–8, their most notable previous works were new vestries at Newburgh church and additions to the Convent of the Holy Child in Preston; the practice had no demonstrable experience of drawing up plans for industrial premises. Their design for the Vulcan Works proposed an elegant administration block incorporating two stepped bays with semi-circular pediments, terracotta dressings and a central louvred cupola. Two bays of the north-light machine shop to the rear overlapped each end of the office, with the end walls having round windows and more terracotta dressings. The architects' drawing also depicts a chimney and buildings with louvred roofs to the rear of works, denoting the position of the power plant and foundry (Figure 3).

The new factory was to occupy an undeveloped site opposite Crossens railway station, with ample room for further expansion (Figure 4). The foundation stone was laid by Sir George Pilkington on 23 February 1907, and construction work proceeded at a rapid pace thereafter. The site was visited the following week by a correspondent from *The Building News*, and whilst the resultant account was written as though the works had been completed, this could not have been the case and was presumably based to some extent on an examination of the detailed design plans:

The main front faces the main highway, and is set back 30 feet [9.14m]. The centre portion is taken up with the offices, this portion also being two-stories high. On the ground floor is the main entrance, which leads into a hall and corridors. On one side of the hall is placed the time-keeper's office. Entered from the corridor are the works manager's office, drawing office, foreman's office, and the usual lavatory accommodation. On the first floor, which is reached by a wide staircase, is the men's dining-room, also a small room for printing drawings, etc. The works, which are one storey in height, and finished with a weaving shed type of roof, are placed behind and on each side of offices, and are supervised from the latter by means of glazed screens. The works are 175 feet long by 170 feet wide [53.34m × 51.82m], which at present will be divided into machine shop and erecting shop: it is hoped, however, when business increases to use the whole of this area as a machine shop, and build further additions to be used as the erecting shops. At the westerly end of the machine shop is placed an engine room, separated from the former by glazed screens. Immediately adjoining the engine room is





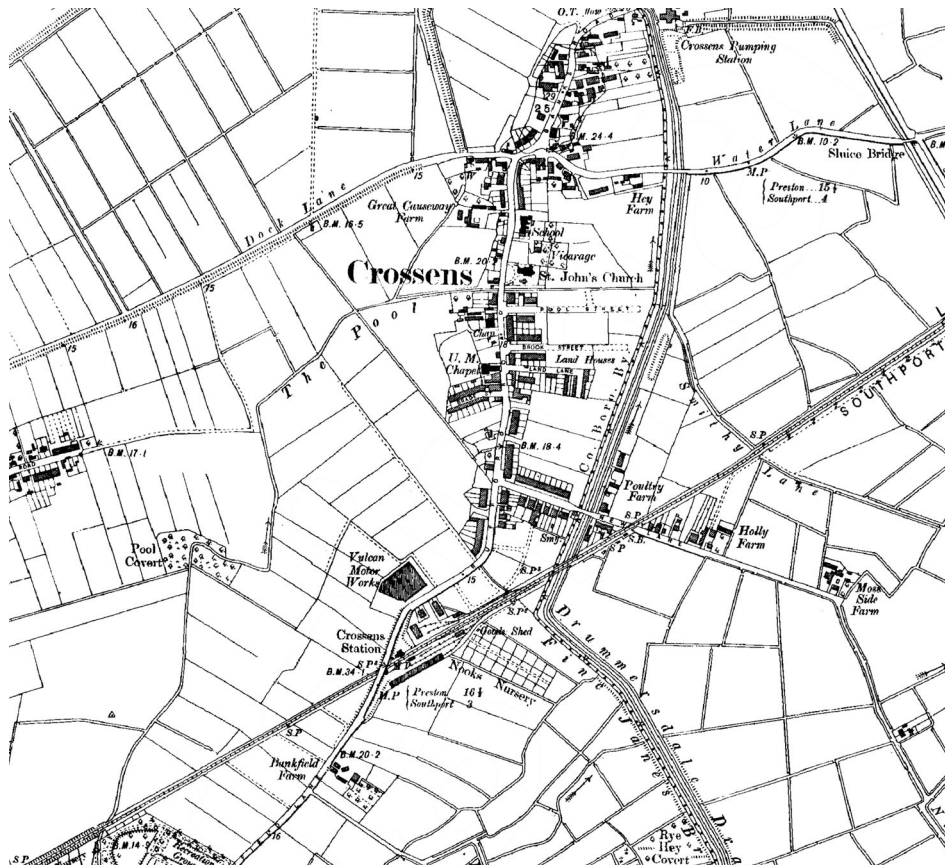
**Figure 3.** Architects' drawing of the Vulcan Works produced in 1906 (private collection).

the gas producer plant house, wherein the gas is made to drive the engine. A smithy, 80 feet by 39 feet [24.38m x 11.89m] is also provided, as also a brass foundry 46 feet by 63 feet [14.02m x 19.20m]. The constructional portion of the works is of steel; the tie beams to principals having been made extra strong to carry shafting.<sup>25</sup>

The building work had been largely completed by September 1907, allowing the first cars to be assembled. It has been estimated that the Hampsons produced 35–40 cars at Hawesside Street in 1904, increasing to 50–60 and then peaking at 100–130 in 1905 and 1906 respectively. At the new factory, however, they were

able to assemble approximately 20 cars per week by the end of 1907, representing a near tenfold increase in production.<sup>26</sup>

The Ordnance Survey map of 1911, which was surveyed in 1908–9, shows the footprint of the works to have conformed broadly to the architects' drawing of 1906. The archaeological survey of the works carried out in 2019, comprising three-dimensional laser scanning coupled with rectified terrestrial and aerial photogrammetry, similarly corresponded closely with the outline of the buildings captured by the Ordnance Survey, but allowed significant internal detail to be added (Figure 5).



**Figure 4.** The footprint of the Vulcan Works shown on the Ordnance Survey second revision 1:10,560 map of 1911, surveyed in 1908–9.

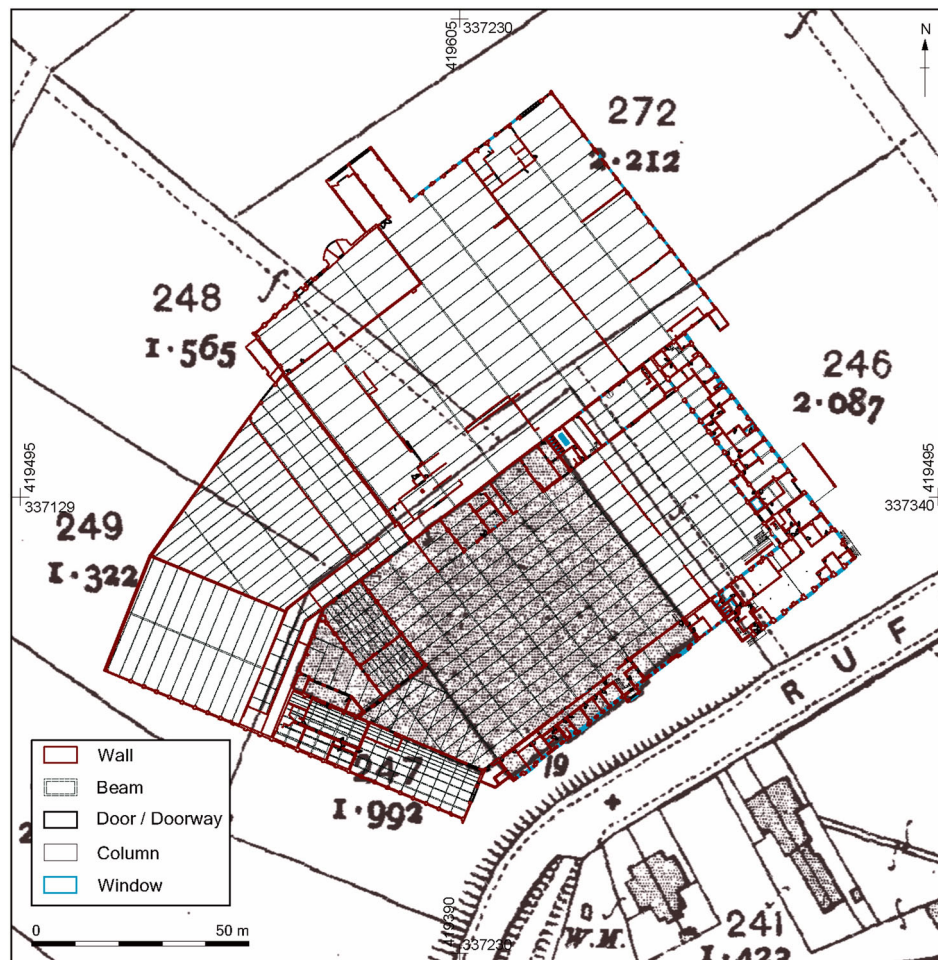


Figure 5. The results of the archaeological survey superimposed on the Ordnance Survey 1:2500 map of 1911 (© University of Salford).

### The Administration Block

The two-storey administration block formed the principal façade of the works, and was the only component that had any significant architectural embellishment (Figure 6). Whilst the external elevations retained no visible indication for different episodes of construction, the archaeological survey determined that it had originally conformed to the architects' drawing of five bays between two projecting bays, with the north-eastern bay housing the main entrance porch. Each end of the building was extended in 1913–14, more than doubling its capacity. In its final form, it comprised 23 bays with four projecting bays of a similar style having terracotta detailing and rounded pediments (Figure 7). It had narrow bays between and outside the wider projecting pilasters, with six bays flanking the central five-bay section, forming a slightly narrower central range but nevertheless affording well-considered proportions to the frontage. The external elevations were built in hard-glazed engineering brick, laid in simple stretcher bond, and the hipped slate roof had a centrally placed louvred cupola. Historic photographs show that the recessed bays were adorned with scrolled panels of terracotta tiles that announced the 'VULCAN MOTOR AND ENGINEERING CO LTD', although these were hidden by modern signage at the time of the archaeological survey. Above the doorway to the main entrance was a small parapet with brick pilasters to each corner, capped with ball finials. At the centre of the parapet, terracotta tiles spelling 'ENTRANCE' flowed over what appeared to be a sunbeam fan with the oversailing terracotta moulded copings following the line of the letters to form a curved central panel within the parapet. Numerals '1907' fabricated in metal were placed within the round-headed pediment of the same bay, on a background of large terracotta tiles (Figure 8).

A corridor to the rear of the entrance lobby connected to all the offices on the ground floor, with the first five to the south-west having formed part of the 1907 building (Figure 9). These were of slightly different sizes, although the first office, adjacent to the entrance lobby, was the largest by a small margin. The south-western wall of the fifth office was somewhat thicker than the other walls, and evidently represented the vestiges of the gable wall to the original building. The adjacent four offices, which included toilet facilities for male employees, had been added in 1913–14. Two doorways and six large windows set in the north wall of the corridor, opposite the original five offices, provided access and clear sight into the machine shop. Two central bays contained timber-framed windows set within round-headed arches, whilst the remaining bays had horizontal windows above a brick plinth, with dividing piers of varying width.

A small room to the right of the entrance lobby formed the timekeeper's office. The rear wall of this room represented the north-eastern gable end of the original building, although two doorways had been inserted subsequently. The extension to this end of the building in 1913–14 comprised a large room, the northern wall of which was dominated by a glazing band of six-light timber-framed windows that overlooked the machine shop. An I-section steel beam formed the lintel of the glazing band and carried the timber joists of the floor above.

A stairwell in the entrance lobby afforded access to the first floor that contained seven offices of various sizes, four to the south-west of the stairwell and three to the north-east. The majority of the rooms at first-floor level had been modernised, although the two eastern rooms in the extension of 1913–14 retained what appeared to be original timber-panelled walls below a moulded timber picture rail. The larger of these two





**Figure 6.** The empty administration block in 2019, shortly before its demolition (© University of Salford).

rooms had probably been used as a boardroom, and featured a fireplace with a marble surround (Figure 9).

### *The Machine Shop and Erecting Shop*

The single-storey machine and erecting shop of 1907 was constructed using I-section rolled steel beams carried on vertical I-section steel stanchions set into a concrete floor, supporting an asymmetrical north-light roof (Figure 10). The shallow southern pitch of the roof was of timber construction with rectangular-section rafters carrying battens for the regularly coursed slate roof. The steeper north pitch comprised a single glazing band of large upright panes, carried on T-section galvanised steel rafters that clasped the channel-section valley gutters. Cast-iron downpipes from the valley gutters were placed against the web of the stanchions on every second row. The upper end of the stanchions had angle-iron cleats, bolted to the soffits of the beams carrying the valley gutters and those placed transversely across the building, forming the tie beam of the half-fan roof trusses. Early photographs confirm that this part of the works was used as a machine shop, with the machinery being driven by belts from overhead line shafts (Figure 11).

The north-light roof design of the machine shop represents a culmination of years of development of efficient shed design in the textile industry. Until the introduction of rolled steel to the structural frame of north-light weaving sheds from the last decade of the 19th century, the spacings between cast-iron columns were generally no greater than 4.3m. A rolled-steel beam was lighter, cheaper to produce and, crucially, could span

two roof pitches, with columns only required at every second valley of the multiple-span north-light roof. The use of rolled-steel joists therefore allowed for columns to be spaced wider on both axes of the shed, increasing bay widths to around 7.4m and allowing machinery to be placed with less interruption by columns. The simplification of multiple-span roof valley gutters also allowed for cheaper casting, culminating in rectangular channel-section valleys that were placed on a very gentle gradient, with downspouts cast into the channel to avoid leakage at the join. The machine shop at the Vulcan Works incorporated internal downspouts, and the north-light glazing was framed with galvanised steel, which began to supersede timber frames in textile-weaving sheds from the late 19th century.

Whilst the design of the 1907 machine shop was influenced by the application of new materials and techniques to the buildings of the textile industry, two noticeable differences were observed during the historic building investigation. Firstly, the hollow cylindrical cast-iron columns seen almost ubiquitously in textile mills and weaving sheds of the period were replaced by the same rolled-steel I-section beams used for the ceiling beams, but set vertically as stanchions. This technique became widespread following the First World War, but does not appear to have been taken up within the buildings of the textile industry. Secondly, rather than spanning two roof trusses with a single beam, the size of each truss was increased to 6.7m, giving a much taller roof with stanchions supporting every valley.

The eastern end of the machine shop was eventually extended by four bays. This extension was of a very similar design to the original, comprising a rolled I-section steel frame and a



**Figure 7.** The elegant façade of the administration block (© University of Salford).





**Figure 8.** The 1907 entrance porch to the administration block (© University of Salford).

north-light roof, with the exception of the eastern bay that had a pitched roof (Figure 12). The beams had 'Frodingham Iron & Steel Co. Ltd, England' rolling stamps on the web. This company became the Appleby-Frodingham Steel Company in 1912 and amalgamated with the United Steel Companies in 1918, and whilst it may be anticipated that existing stock bearing the original stamp will have been in circulation post-1912, this nevertheless suggests that the extension was completed before 1918. It appeared to have been built in conjunction with a second office block, which post-dated the extension to the original administration building in 1913–14 and probably formed part of an expansion during the First World War.

### **The Early Power Plant**

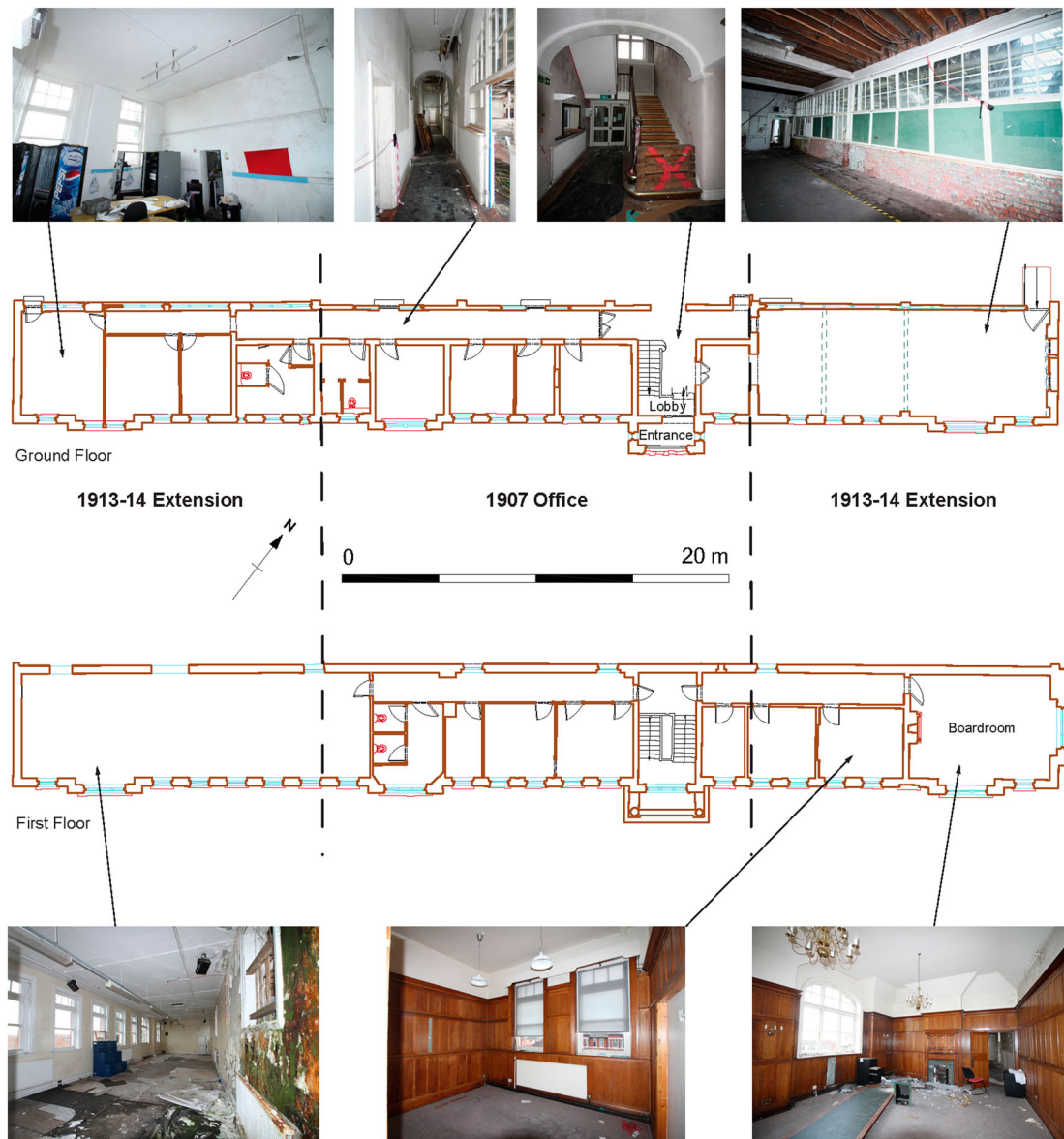
Historical images show the machinery to have been driven by belts from overhead line shafts, although no visible indication for the position of the line shafts survived at the time of the archaeological survey. There was similarly no firm evidence to show how the line shafts in the machine shop were turned originally, although the careful removal of the concrete floor during demolition in 2020 uncovered physical remains of the original power plant in the two rooms that formed the western corner of the 1907 works (Figure 13). A room immediately to the west of the machine shop was found to contain the foundation bed for the gas engine referred to in the description of the works that was written by the correspondent from *The Building News* at an early stage in the construction programme.<sup>27</sup> Contrary to that description, however, the engine house was separated from the machine shop by a solid wall rather than by 'glazed screens', whilst the dimensions of the engine room (24.38m × 11.89m) corresponded exactly to those given for a smithy, hinting that the original design plan was modified during the construction programme.

Brick piers embedded in the engine house walls carried the ends of the iron fan trusses, which supported a tall pitched roof with glazing bands below the upper timber purlin of each pitch. The roof retained a raised hipped central timber louvre, as depicted on the architects' drawing of 1906. A tall arched window typical of engine houses attached to other types of industrial works was set in the centre of the north wall, although the lower part had been remodelled as a doorway (Figure 13). A

large electric fan bolted to the inner wall face directly above the window appeared to be an original feature, together with an octagonal chimney that was built into the wall forming the north-western corner of the engine room. The foundations of the chimney were excavated after the demolition of the building, and were found to be just 1.6m wide, with an inner width of 0.50m and a 0.86m-wide flue lined with firebricks on the north-western side. This had seemingly been decommissioned at an early date, as it was blocked with a large stone slab.

The remains of the engine bed were also uncovered during demolition in 2020 and the removal of a concrete floor and an associated brick-built partition that had been erected across the engine house after the gas engine had been replaced by a larger power plant at the southern end of the works. The engine bed lay in the south-western part of the room, parallel to the western wall, and comprised a concrete base that measured 7.82m long × 1.40m wide × 0.15m thick, set directly onto the natural clay geology. This provided a foundation for a brick trough with sides constructed from firebrick enclosing an inner area of c. 6.25m × 0.47m (Figure 13). Midway along the engine bed was a square section (0.96m × 0.96m) of common bricks, set partly on a concrete base. The brick base retained a steel tie-down bar (0.03m diameter) at each corner, which may have been intended to house an electrical generator adjacent to the engine. A circular feature, 1.25m in diameter, was cut into the clay geology in the centre of the engine house. The centre was formed of a 1m-diameter solidified block of corroded iron with thick patches of oxidised copper, identified tentatively as the decayed remains of electrical equipment.

The room to the west of the engine house formed the north-western corner of the 1907 works, and presumably represented the gas-producer plant house referred to in the description published in *The Building News* in 1907.<sup>28</sup> As with the engine house, this room had an open ceiling exposing the L-section steel fan trusses, and a tall arched window flanked by brick piers in the north wall, although the external face had been blocked subsequently (Figure 13). A double doorway below the window formed the entrance from a passage around the perimeter of the works, as shown on the Ordnance Survey map of 1911 (Figure 4). The roof had been replaced, removing the central louvre depicted on the architects' drawing. An internal structure comprising three open-fronted bays and a fourth bay with a

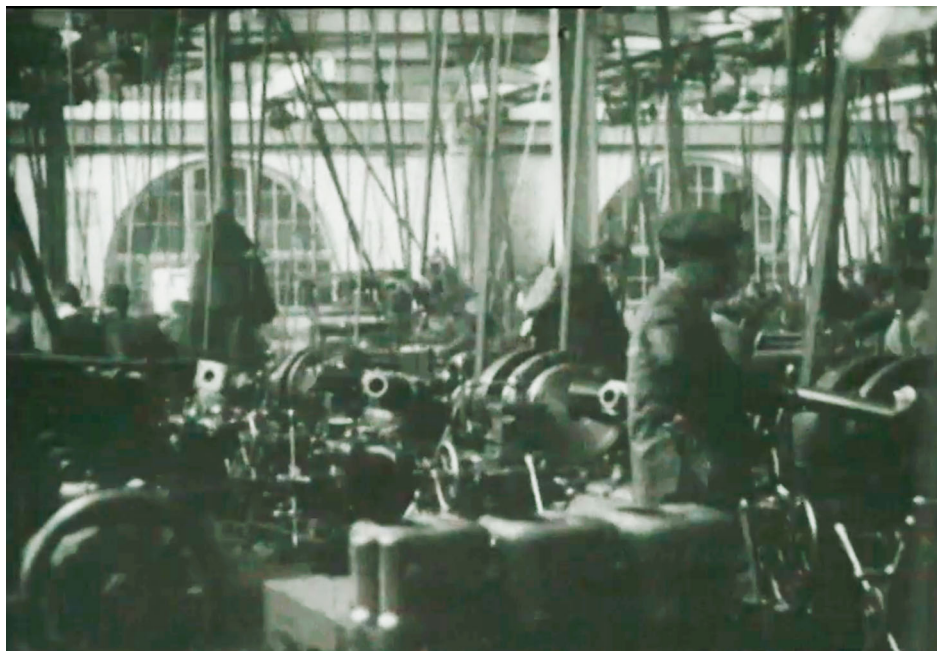


**Figure 9.** The ground- and first-floor plan of the administration block (© University of Salford).



**Figure 10.** The machine shop, showing the two arched windows set into the north wall of the administration block (© University of Salford).





**Figure 11** . View across the machine shop in c. 1912, showing the belt-driven machinery and the arched windows in the wall of the administration block (© North West Film Archive at Manchester Metropolitan University).

wide double doorway occupied the western side of the room. Each open bay had steel and concrete lintels that were carried on bull-nosed brick columns.

As with the adjacent engine house, the gas-plant house contained a concrete floor that covered any evidence for the original equipment, although removal of this floor exposed an octagonal concrete slab that measured 4m wide and 0.5m thick, closely resembling the base shown in a contemporary illustration of a suction gas producer (Figure 14). An infilled channel on the underside ran to the centre of the slab, and metal pins extended from the outer edge. A 1m-square concrete trough covered with an oily black tar residue was also unearthed in this area.

At the time of the survey, the room to the south of the gas-plant house was open to the machine shop to the east, although scarring visible on the concrete floor seemed to represent the line of a former partition. Taking this scar as the eastern side of the room, it measured 19.35m wide at the northern end, which reduced to a width of just 4.15m at the southern end. The room had the same structural layout as to the machine shop, with I-section steel ceiling beams and supporting columns, although the roof had been replaced, removing the central timber louvre shown on the architects' drawing of 1906. There were no surviving fixtures or fittings to betray the room's original function, although it is possible that it had housed the smithy and brass foundry mentioned in the description published in *The Building News* in 1907; a foundry furnace is also mentioned in a newspaper article, which reported that the foreman of the moulding department 'threw the patterns, valued at about £19, into the furnace' in January 1908 after an argument with the works manager.<sup>29</sup> The inclusion of a foundry within the main works was an unusual arrangement, as it was typically separate due to the dirt and fire risk.

### Pre-War Expansion

The company sustained a loss of £4,000 on the increased capital during the first year of production in the new factory. The financial woes were compounded by a fire that gutted the Hawesside Street works in May 1908, destroying the painting and finishing shop, together with six complete cars and 51 car bodies, causing damage estimated at £4,000.<sup>30</sup> The financial report for the year ending September 1909, however, showed a

net annual profit of £15,823, and the situation had improved sufficiently by 1911 to enable additional workshops and erecting shops to be built.<sup>31</sup> Whilst the Hawesside Street works had been restored for use after the fire in 1908, the body painting, upholstery and finishing departments were transferred to Crossens after the new factory was extended in 1911, and the Hawesside Street works were used thereafter for testing and repairing vehicles.<sup>32</sup>

One of the workshops built in 1911 abutted the south-western elevation of the gas plant house. This single-bay structure was 47.8m long and 11.5m wide, and had a pitched gable with a parapet wall capped with over-sailing terracotta copings (Figure 15). The south-eastern gable wall housed a large entrance with a timber sliding door, and a bullseye opening above that had terracotta dressings and retained a nine-light round timber-framed window. Internally, this high-roofed single-storey workshop comprised two compartments, divided by a brick-built partition. The south-eastern compartment had a concrete floor, painted brick walls and a high ceiling exposing the L-section steel fan trusses, and was used latterly as a covered garage in which the directors' and staff cars were parked during the working day.<sup>33</sup> A small mezzanine with a rolled steel I-section frame, carried on I-section stanchions, had been inserted across the northern end. The steelwork was stamped 'Appleby-Frodingham Steel Co', indicating that the mezzanine had been erected after 1912, when these two steel companies merged. A doorway in the partition adjacent to the mezzanine afforded access to the north-western compartment of the workshop, which had been divided into a series of rooms.

The exterior of the workshop appears in a film taken by the Weisker brothers in c. 1912 that captures the employees at the end of the day leaving the works via the sliding doors across the large entrance in the south-eastern gable wall.<sup>34</sup> This film also features clips of the car-manufacturing processes, commencing in the foundry with scenes of casting an aluminium engine case. The following section focuses on the machining of engine components, including the turning of pistons, the grinding of a crankshaft and assembling the finished engine parts. The chassis assembly is then featured, showing the manual process of fixing the axles to the frame, whilst supported on wooden trestles, and dropping the assembled engine and gearbox into position and fitting the wheels (Figure 16). The process of making and fixing the aluminium body parts is also presented, together with views of the



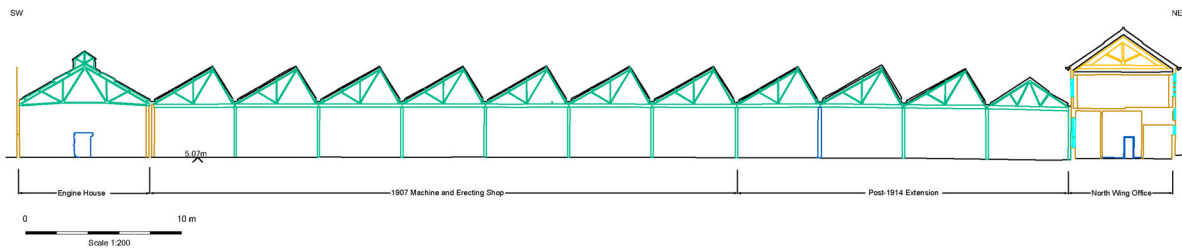


Figure 12. Section across the north-light roof of the machine shop (© University of Salford).

paint and upholstery shops. It is apparent from the film that all the various processes required groups of skilled craftsmen, with little indication of a formal production line in place. This is made particularly clear by the filmed process of assembling a chassis supported on wooden trestles outside the workshop of 1911.

Two other workshop ranges were also likely built in 1911–12, although cannot be identified in the film of c. 1912. The first comprised two single-storey workshops that were placed to the north of the gas-plant house. They were of a very similar style to the workshop to the south that was built in 1911, and whilst they

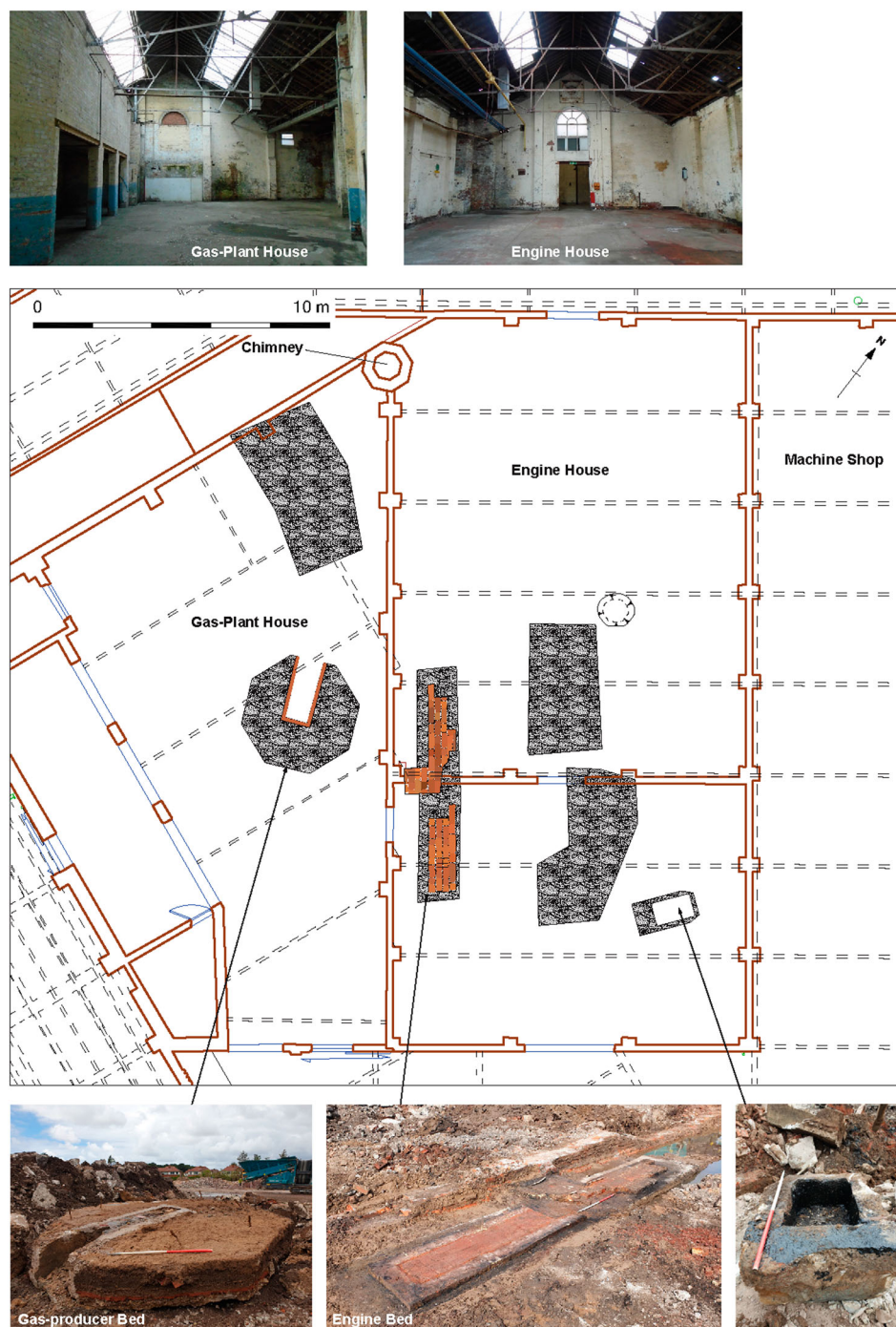
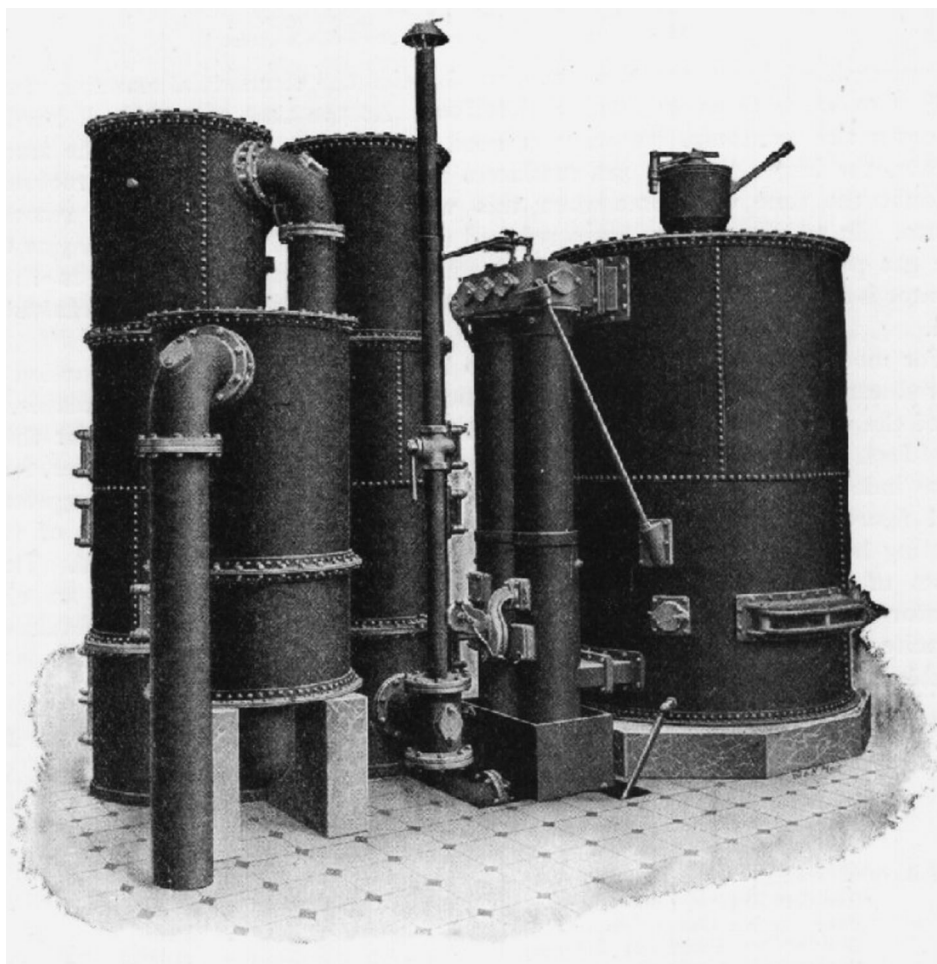


Figure 13. Plan of the engine house and gas-plant house (© University of Salford).



**Figure 14.** National suction gas producer of a type that may have been installed in the Vulcan Works. This example was a new type introduced in 1906 and exhibited at the Royal Agricultural Show in Derby, where it was awarded the gold medal (reproduced from Cades Alfred Middleton Smith, *Suction Gas Plants* (London: Griffin, 1909)).

had modern roofs, aerial photographs taken in the 1920s clearly show that they were capped originally with a central louvre. The buildings were in poor condition at the time of the archaeological survey, precluding physical entry.

The second range comprised a row of four large single-storey workshops situated to the north of the engine house, adjacent to the two workshops to the rear of the gas-plant house, although at a slightly different angle (Figure 17). Each bay had a pitched gable, with a parapet wall capped with over-sailing terracotta copings. At the centre of each gable was a bullseye aperture, similar to those adorning the workshops along Rufford Road. The intended use of these buildings is not entirely certain, although they may have temporarily housed the body painting, upholstery and finishing departments when these were transferred from the Hawesside Street works in 1911, and were perhaps used subsequently for enhanced foundry and smithing operations.

The company's capital was increased from £75,000 to £150,000 in 1913, enabling further expansion of the works.<sup>35</sup> Notification that the contract for these 'extensive additions to the Vulcan Motor Works' had been let was printed in *The Building News* in October 1913, which stated that

these additions will be used for the body building, upholstery and painting departments. One portion is one story in height, similar to the existing works, and the other two stories, finished with a water tower, covered with green slates. The two floors are connected by a large electric lift. A new heating chamber is also being provided, with a timber-drying room over.

It was also noted that the administration block was to be extended, having 'become inadequate in size owing to the

increase in business'.<sup>36</sup> Excepting the extensions to the offices, these buildings were all demolished in 2014.

### Pre-First World War Labour Force

The employment of at least 750 men at the Vulcan Works prior to the First World War represented a significant expansion of the local population, with many of the workers bringing their skills to Crossens from industrial towns across Lancashire, particularly from established centres of engineering such as Bolton and Wigan. At least one Vulcan employee, Wilfred Meakin, had served an engineering apprenticeship at the locomotive works in Crewe before moving to Southport in 1911 to work in the tool department at the Vulcan Works.<sup>37</sup> It has been suggested that the factory attracted workers as it was considered to be 'years ahead of its time', and working in light, airy glass-roofed sheds surrounded by fields was far removed from much of industrial Lancashire.<sup>38</sup> The son of one of the first workers at the Vulcan Works later recalled that 'the fact that one worked there gave one a certain cachet in the community' which, again, was in contrast to the social status of factory workers in the established industrial towns.<sup>39</sup>

The influx of new workers inevitably led to an expansion of the local housing stock, whilst analysis of the 1911 Census shows that Vulcan workers predominantly lived on the southern side of the village, with distinct concentrations on Pool Street, Brook Street and Land Lane (Figure 18); it is of note that there were only two houses on Pool Lane and four on Brook Street listed in a directory for 1906, which had increased to ten and 16 respectively by 1911.<sup>40</sup> A later worker at the factory, Billy Gordon, recalled that 'the whole





**Figure 15.** Workshop built in 1911, featuring a bullseye opening above the sliding entrance door (© University of Salford).

of New Lane was occupied by Vulcan workers', although this was evidently a post-1911 development.<sup>41</sup>

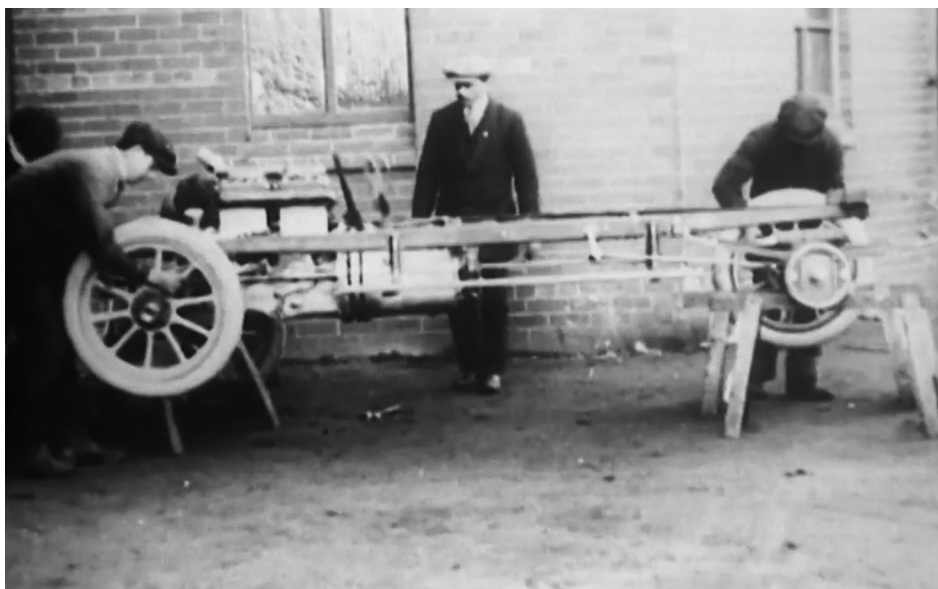
Workers who did not live in Crossens could reach the factory easily due to its location adjacent to the railway station. Many of the managers lived in the Manning Road area of Southport, near Meols Cop station, which was built to serve the expanding eastern suburbs of Southport. There is nothing to suggest that the Vulcan Motor & Engineering Company financed any house building prior to 1914, although they did build several houses around Ribble Avenue with the financial support of government subsidies for munitions workers during the First World War.

### The War Years

The First World War had a significant impact on the production of cars in Britain, as the motor industry's resources were directed to the war effort. Two major military defeats in 1915 were blamed on a lack of munitions, stirring up a 'shell scandal' that led in no

small part to the collapse of the government. David Lloyd George, the first 'Minister of Munitions' in the new coalition administration, induced and then threatened manufacturers to take on munitions works. Many car factories were duly extended to accommodate their war work, and the larger firms switched entirely to producing armaments, military vehicles and aircraft, although companies such as Humber, Rover, Sunbeam and Vauxhall managed to combine this with limited car production.<sup>42</sup> The Vulcan Works focused production on lorries during the war and, by 1918, was producing over 100 per week. All of the parts, except for the engines, for a number of aircraft, including the Airco DH9, were also produced, together with gun limbers and ambulances. Munitions, and specifically mine-firing mechanisms, hydrostat switches and depth-charge pistols, were also produced for the Admiralty.

In 1917, whilst still serving as managing director of the Vulcan Motor Works, Thomas Hampson was elected Mayor of Southport and, in the following year, acquired Southport football club. In



**Figure 16.** Assembling the chassis of a Vulcan car in c. 1912 (© North West Film Archive at Manchester Metropolitan University).





**Figure 17.** The developmental phases of the Vulcan Works annotated on an aerial photograph (© University of Salford).

effect, the club was taken over and financed by the Vulcan Motor Company on the condition that it was called 'Southport Vulcan', thereby becoming the first English football club to take a sponsor's name. However, the company relinquished their control the following season, not least due to Thomas Hampson being found guilty of applying £22,266 of capital from the Vulcan Company for his own use, for which he was sentenced to 12 months in gaol.<sup>43</sup>

It is possible that the second office block was built during this period. This two-storey, L-shaped range was placed slightly to the north-east of the original office overlooking Rufford Road, and included the only basement within the works. The building was not as impressive architecturally as the original office, although it incorporated a few features that were drawn from the earlier structure, including three stepped bays in the principal façade, and the rounded terracotta pediment at the apex of the gable walls that mirrored the detail employed in the erecting shops along Rufford Road (Figure 19).

In contrast to the earlier building, the second office block employed two rows of cylindrical steel columns along the ground floor to support the ceiling beams; the foundations for these columns were provided by a series of brick-built piers in the basement. The ground floor had been modernised, with multiple timber-framed stud partitions inserted to create offices. The first floor was accessed via two separate stairwells and, again, had been modernised. The basement, however, appeared to have retained its original layout to a large extent, and comprised a series of storage compartments. Direct access to the basement from the extended machine shop was afforded via a shallow ramp, whilst a double door in the principal façade provided external access, together with a second door in the eastern elevation.

The main entrance to this office was via a two-storey stair tower at the south-western end of the building. The entranceway incorporated chamfered terracotta reveals and bands that protruded from the arched head over the doorway, mimicking the embellishment that adorned the entrance to the 1907 office block (Figure 19). This stair tower abutted the south-western gable of the second office, and was evidently a slightly later addition. This was especially clear on the first floor, where the doorway from

the stair tower had been inserted into the gable wall of the office building. The stair tower was in turn abutted by a single-storey link block that provided access at ground-floor level between the two office blocks.

The final addition to the Vulcan Works was a two-storey, 17-bay wing that was placed against the north-eastern end of the second office block (Figure 19). Its precise construction date is unknown, and whilst it post-dated the second office block, it may nevertheless have been required as part of the war effort. The windows on the ground floor in the western elevation, overlooking the extended machine shop, had flush flat lintels in contrast to the segmental arched heads used on the ground floor in the eastern elevation; each of the lintels on the ground floor incorporated a large projecting terracotta keystone, reflecting the detail employed in the projecting bays of the 1907 administration block. The different window styles and other slight variance in the fabric of the extension tentatively suggested that the building was erected in two phases, with the western wall having formed the eastern wall of the extended machine shop initially, and the first floor added at a slightly later date.

The ground floor of the wing block contained a series of offices, whilst the first floor was dominated by a single large room with three interconnected offices at the northern end, each with timber-panelled walls. The first floor also housed the only wash-room facilities for women in the entire works, highlighting the dominance of male employees. Indeed, whilst it is accepted that the washrooms recorded during the archaeological survey had been remodelled, it seems possible that the workforce was entirely male until the First World War, when women were first employed to work on the production of munitions.

### Interwar Expansion

Following the cessation of hostilities in 1918, the company moved into large-scale production of lorries with the Vulcan Standard Commercial vehicle, which they offered in addition to a range of cars. With Thomas Hampson in gaol, however, C.B. Wardman took control as managing director. During this period, 75% of the Vulcan Motor & Engineering Company was acquired under a

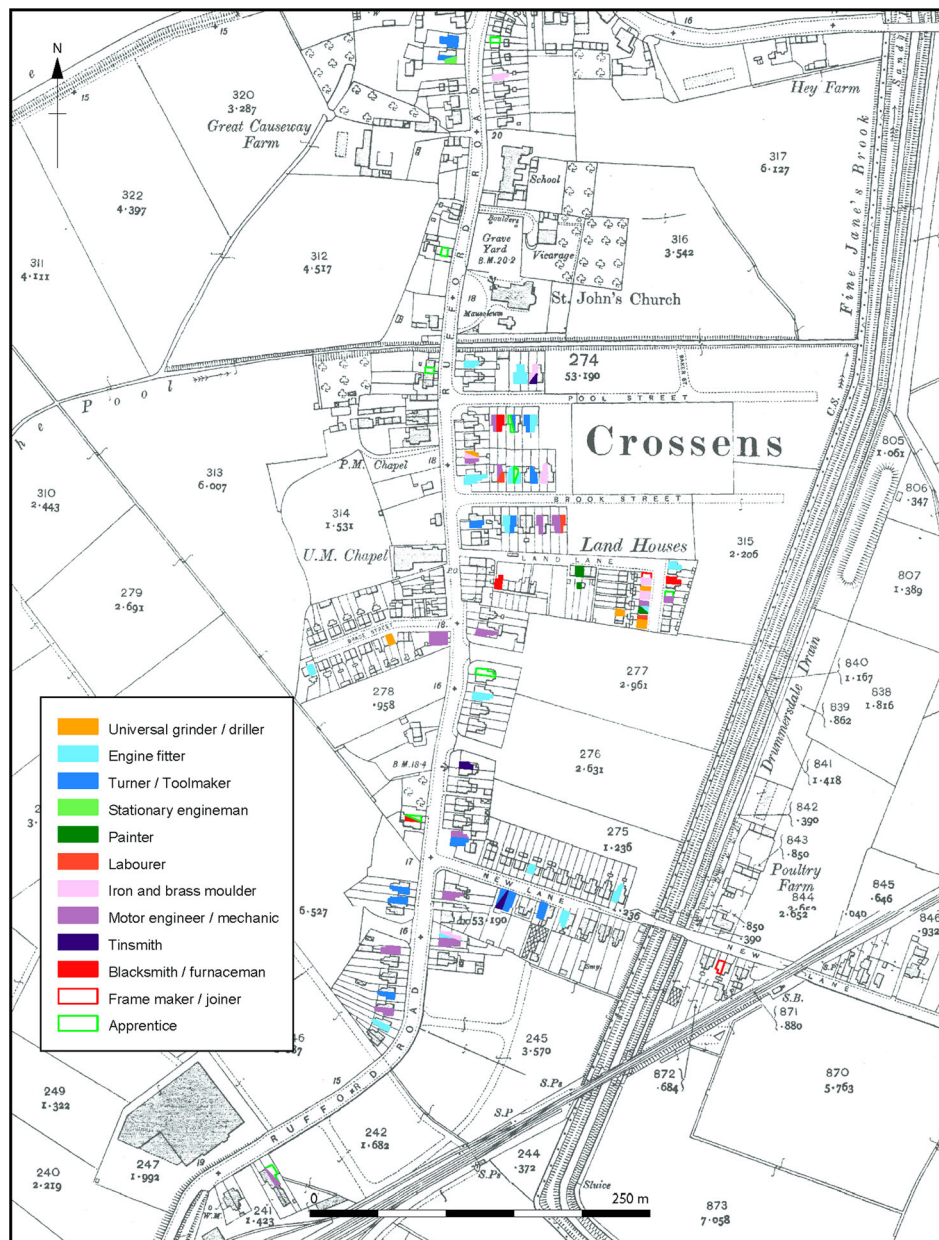


Figure 18. Houses in Crossens occupied by employees of the Vulcan Works, based on data from the 1911 Census (© University of Salford).

complex cash and shares deal by Harper Bean Ltd, a public company formed in 1919 to bring together several interests in the expanding motor-vehicle manufacturing industry.<sup>44</sup> This appears to have led to substantial investments in the plant, and the adoption of a mechanical production line at the Vulcan Works.

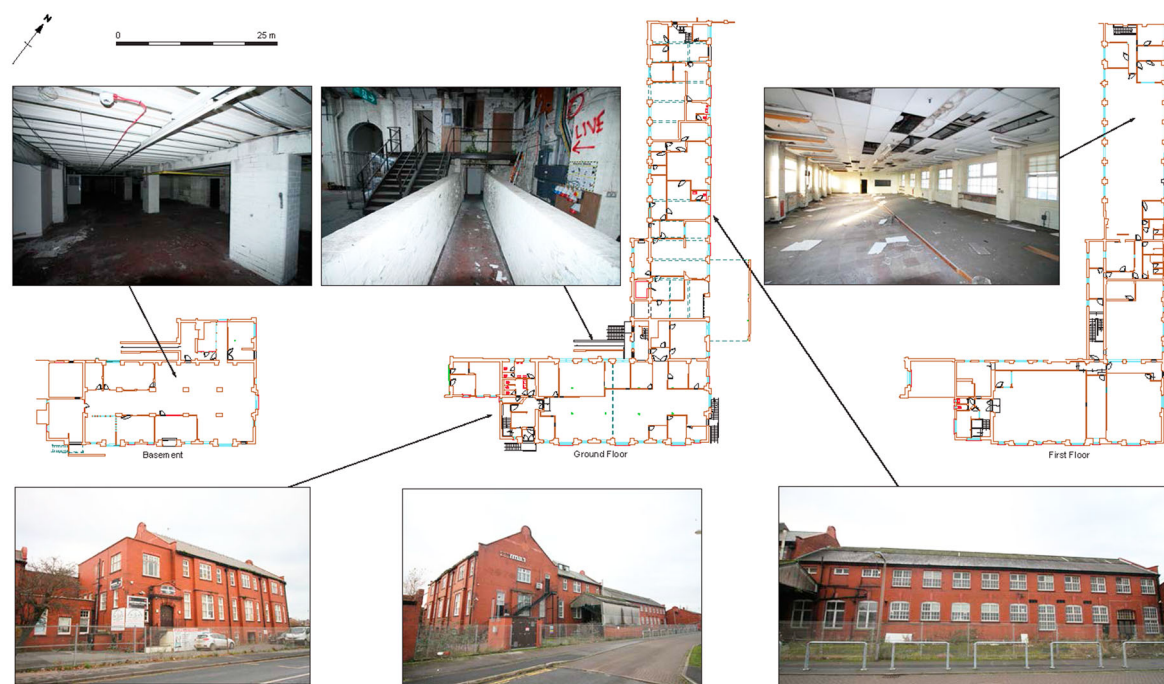
A description of the new production line based on a visit to the Vulcan Works was published in *The Engineer* in 1920.<sup>45</sup> This employed a rail track that extended from the smiths' shop to the painting department and comprised two rails carried on brackets secured to the floor, but with a very slight gradient. The chassis frames were mounted on roller brackets that travelled on the rails, allowing the frames to be pushed by hand through the erecting bays in which the axles, gearboxes, engines, petrol tanks and other components were assembled in groups (Figure 20). The bays were also served by overhead runways for the delivery of components. When assembled, and wheels placed on the axles, the chassis was moved to a covered chamber where it received a first coat of paint by means of spraying apparatus. The production track worked on gravity and did not require any mechanical power, unlike some other works of the period that adopted similar equipment, although broadly comparable systems were employed elsewhere. At the Hillman works on Aldermoor Lane

in Coventry, for instance, the natural slope across the site was utilised during the 1920s to aid the transfer of the components downhill through the machine shop on roller conveyors.<sup>46</sup>

The account also noted an unusual means of driving the line shafting in part of the works. This employed a partially assembled 30cwt Vulcan lorry, secured to a framework with a belt pulley attached to the final drive shaft behind the gearbox (Figure 21). This temporary arrangement was said to be sufficient 'for driving ten machine tools' and was adopted 'because of a dearth of power in the central power station of the works'.<sup>47</sup>

In June 1920, the company held a grand dinner at the Prince of Wales hotel to celebrate the manufacture of over 1,000 lorry chassis in the first six months of the year (Figure 22). However, less than two months later the workforce of approximately 2,000 was served with a week's notice, caused by the sluggish sale of lorry chassis.<sup>48</sup> In response, the Vulcan Motor & Engineering Company pulled out of the combination with Harper Bean and proposed to re-organise the factory for the production of a Vulcan Standard pleasure car before re-opening.<sup>49</sup> It was reported in November 1920 that Vulcan was producing their new four-speed 20hp car at a rate of around 40 per week.<sup>50</sup> However, a review of the accounts for the 15 months up to December 1920





**Figure 19.** The basement, ground- and first-floor plan of the second office block (© University of Salford).

showed a loss of £447,000, and the works was closed again in 1921 due a depression in trade. Some creditors served a winding-up order on the company, although a short floruit of orders persuaded the majority of creditors to agree a rescue scheme.<sup>51</sup>

From 1922, Vulcan worked with Lea-Francis of Coventry, pooling dealerships and rationalising some of their production. This arrangement proved to be advantageous and, by January 1923, orders had trebled compared with those of January 1922. This included a significant growth of orders from overseas, including a bus designed for the Spanish market that attracted the attention of several English municipalities.<sup>52</sup> A continued rise in the demand for motor cars led the company to introduce a nightshift, and the workforce increased to 1,225.<sup>53</sup> The net profit recorded for 1926 was £18,963, leading an editorial in a local newspaper to proclaim that the transformation in the company's fortunes was the 'most remarkable in the history of the motor industry in this country'.<sup>54</sup> The works had reached its full extent by this date, as shown on an aerial photograph taken in 1924 (Figure 23). It is evident from the detail captured on this photograph that the 'dearth of power' experienced in the machine shops may have been addressed by the addition of a new power plant that occupied the southern edge of the works. This comprised a large boiler house and associated tall chimney, together with a reservoir with what appears to be a cooling tower, forming the key components of a steam-turbine electric power station.

There was another temporary closure of the factory in 1927, and the workforce of approximately 1,000 was halved. Car production finally ceased in 1928, and the company concentrated on manufacturing 20- and 22-seater buses and commercial vehicles. The introduction of the 51-seater 'Emperor' bus secured orders from several local authorities, including Birmingham and Southport, with the first bus going into service in 1930. However, a subsequent contract valued in excess of £32,500 to supply buses to Southport Corporation in 1934 was awarded jointly to Leyland Motors and the English Electric Company in preference to Vulcan. A final devastating blow was delivered in 1937, when the company failed to secure a further contract from Southport Corporation to build the bodies for another five double-decker buses, despite 500 Vulcan employees holding a mass meeting to protest against the corporation's decision.<sup>55</sup> This led

to the production rights to the motor vehicle side of the Vulcan business being sold to the Tilling-Stevens Group, which transferred production to Maidstone in Kent.<sup>56</sup> The entire share capital of Vulcan Motor & Engineering was then acquired by J. Brockhouse & Company from the Midlands.<sup>57</sup>

### Post-Vulcan

Brockhouse was primarily a trailer manufacturer and wanted the Vulcan Works and associated land, but was not looking to continue the production of motor vehicles. The works was renamed Brockhouse Engineering (Southport) in the following year, and continued in use for engineering purposes.<sup>58</sup> In 1939, Brockhouse announced their plans to extend the works, and intended to employ 'an additional number of workpeople of from one to two thousand'.<sup>59</sup> This extension comprised a row of large, single-storey workshops that were placed to the north of the machine shop (Figure 17). Interestingly, having served his gaol sentence, Thomas Hampson joined the Board of Brockhouse and eventually became general manager.<sup>60</sup>

### Second World War

It was reported as early as January 1939 that the Brockhouse Engineering Company was 'carrying out considerable armament work' at Crossens, and that the works 'have helped to restore that district to the former state of prosperity it enjoyed'.<sup>61</sup> During the Second World War, the works produced turrets for Wellington and Lancaster bombers, and went on to specialise in fabricating fuel tanks for aircraft. The works was damaged during a Luftwaffe air raid on 12 March 1941, when the factory was struck by two bombs, which killed one young man and injured at least nine others.<sup>62</sup>

### Post-War

In a slightly ironic twist, given the origin of many British car manufacturers, Brockhouse produced motorcycles at their Crossens factory from 1948 to 1955. These included the Corgi, a 98cc two-stroke model, that was also produced as a folding scooter as a





**Figure 20.** The gravity erecting track (reproduced from *The Engineer*, 1920).

civilian form of a war-time machine that had been used by parachutists.<sup>63</sup>

Brockhouse leased the works in two parts in 1955. The south-western part of the works was taken over by the magnetic components division of Mullard (Blackburn) Ltd as a 'feeder factory' that manufactured electrode sub-assemblies and other specialised components such as cathode-ray tubes for television and oscilloscope screens, and supplied these to the company's main facility in Blackburn. Mullard Ltd had formed a partnership with the Dutch manufacturer Philips in the 1920s, and finally sold all its shares to Philips in 1927, but continued to trade as Mullard. This company was responsible for erecting a suite of new buildings along the Balmoral Drive frontage of the site, and clearing the power plant at the southern end of the site and infilling the associated reservoir. The north-eastern part of the works was leased to several tenants, including Power Sampas, Essex Wire Ltd, the Book Centre, and Dorman Smith Traffic Products Ltd.

### Epilogue to Vulcan

Thomas and Joseph Hampson's Vulcan company was one of an estimated 430 new firms that entered the British motor-vehicle industry between 1900 and 1910, and was one of the few that

remained in business by the 1920s. The formative years of their business was typical of other car manufacturers of the period, occupying small premises that had been built for very different purposes, although the Hampsons were amongst the leading firms in the fledgling industry that engaged a reputable architect to design a purpose-built factory in 1906. This adhered to a format that emerged as the model layout of a British motor-car factory of the period, consisting of single-storey machine and erecting shops placed to the rear of a two-storey administration block.

The architecture of the 1907 administration block was dominated by the rounded pediments embedded in the principal façade, forerunners of the Art Deco style that began in Paris before the First World War, and redolent of the impressive Edwardian Baroque administration building at the Clément-Talbot factory of 1903–4 in West London. It seems likely that Prescott & Bold may have been inspired by the Clément-Talbot factory when formulating their plans for the Vulcan Works in 1906, and whilst the administration block at the Vulcan Works was not as ornate as its counterpart in West London, the architectural quality is nevertheless indicative of the firm's high aspirations. As at Clément-Talbot, the administration block at the Vulcan Works was extended in c. 1913–14 as a consequence of an increase in business. This extension work was executed to a very high



**Figure 21.** Partially assembled Vulcan lorry adapted to driving the line shafting (reproduced from *The Engineer*, 1920).



**Figure 22.** Vulcan lorries outside the works in c. 1920 (© Sefton Library Service).

standard by skilled builders, with no indication of these major alterations visible in the fabric of the main façade; the only physical evidence was discerned from the thickness of the internal partitions that had formed the gable end walls originally.

The single-storey machine shop to the rear of the 1907 administration block employed innovative construction methods and materials, not least the use of structural steel to create broad bay widths and abundant natural light in the machine shop. The machinery was powered by a gas engine of a type commonly employed in engineering works, although the character of the transmission system is not entirely certain. Early photographs clearly depict machinery being driven by belts from overhead line shafts, but is unclear whether these were belt-driven from the gas engine or turned by electric motors (Figure 11). The evidence gathered from the archaeological survey and excavation may suggest the latter, with the electricity being supplied from

an electrical generator connected to the gas engine. The installation of electric drive at its inception would place the Vulcan Works amongst the early regional examples of factories that were designed to be powered by electricity, although the omission of any reference to the transmission system in the detailed description of the works published in March 1907 suggests that the design detail had not been finalised at that late stage.

The Hampsons differed from many of their competitors by entering the industry as skilled joiners and cabinet-makers, rather than coming from a formal engineering background, or having started as bicycle manufacturers. This emphasises the importance of the coach-building trade to the early motor-car industry and, unlike many of their contemporaries, enabled the Hampsons to produce their own vehicle bodies. They also manufactured all the components, including the engine castings and wheels; a reliable supply of components became a significant



**Figure 23.** Aerial photograph taken in 1924, showing the Vulcan Works at its zenith, with Crossens station in the foreground (© Historic England).



factor that limited the expansion of the industry as a whole during the Edwardian era. Car assembly was organised initially on a workshop system, with various sections equipped with the tools to produce a specific component or sub-assembly, as captured in c. 1912 in the film by the Weisker brothers. Rapid expansion demanded more efficient working practices, leading to the adoption of assembly-line production by the early 1920s, following the introduction of this new system in Henry Ford's factory at Trafford Park in 1914.<sup>64</sup> During this period, the Vulcan Company started fitting engines manufactured elsewhere to some of their vehicles. The first use of a bought-in engine was in 1912, when a two-cylinder Aster engine was fitted to a new small car introduced to the range that year. Several other manufacturers supplied engines to Vulcan immediately after the First World War, including W.H. Dorman & Company of Stafford, Henry Meadows Ltd of Wolverhampton and the British Anzani Engine Company in London. Hick, Hargreaves & Company, a long-established engineering company in Bolton with an enviable reputation for producing stationary steam engines and locomotives, invested in machinery to produce petrol engines and other car components as part of their search for new markets during this period, and also supplied Vulcan with engines. Their contract was to supply 1,000 20hp petrol engines, although only 150 were delivered and the contract terminated in 1921 when the Vulcan Works closed temporarily.<sup>65</sup>

The creation of the Vulcan Works transformed Crossens from a rural village to an Edwardian industrial settlement that attracted skilled migrants from the established manufacturing towns across Lancashire. It is perhaps slightly ironic that this was made possible by the railway, which delivered workers and raw materials to Crossens to assist the rapid growth of road haulage that ultimately supplanted rail transport.

### Legacy

The Hampson's original premises on Yellow House Lane were demolished in March 2010. The buildings were unoccupied at that time, and a decision to clear the site was taken in the wake of business tax being levied on vacant premises. The buildings that formed Hawesside Street works are shown on the Ordnance Survey map of 1955, but had been demolished by 1965 and the site has since been redeveloped for housing. Crossens railway station and associated goods yard closed in 1964 and their sites had similarly been redeveloped by the end of the decade, leaving virtually no trace in the modern landscape; the only remains of this infrastructure that was key to the success of the Vulcan Works is the bridge that carries Rufford Road over the route of the former railway.

The Vulcan Works was occupied until 2011, but vacated thereafter and rapidly fell into dereliction. A large part of the works was demolished in 2014, although the original office block and workshop of 1907 survived this phase of clearance. An application to have the surviving buildings considered for designation as a listed building was submitted to Historic England in 2019, although this was not successful and all the buildings were cleared in July 2020 in advance of a new housing development. The net result was the loss of a remarkable survivor of an early motor-car factory that had not been subject to extensive modifications. This loss was offset by the archaeological survey that provided a comprehensive record of the earliest part of the Vulcan Works and, in doing so, demonstrated the value and benefits of recording a 20th-century factory.

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## Acknowledgements

The authors are grateful to Elan Homes, particularly Philip Palmer and Chris Durband, for commissioning the archaeological survey, and to Paul Cryer of ADM Regeneration for facilitating the excavation. Thanks are also expressed to Alison Plummer and Ben Croxford of the Merseyside Environmental Advisory Service for their support and encouragement. The authors are also indebted to Geoff Senior of Manchester Metropolitan University for supplying images of the Vulcan Works from the North West Film Archive, and to the staff of Sefton Library Service for assistance with the documentary research. The project benefited from invaluable input from Chris Wild of Salford Archaeology, who supplied drone photography of the Vulcan Works and provided pertinent comments on the draft text, and to Richard Ker, also of Salford Archaeology, for manipulating the survey data and preparing measured drawings of the buildings.

## Disclosure Statement

No potential conflict of interest was reported by the authors.

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